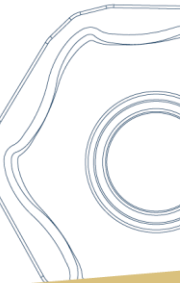
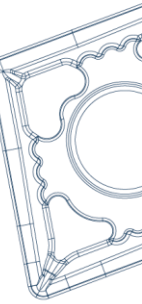




厦门金鹭特种合金有限公司
XIAMEN GOLDEN EGRET SPECIAL ALLOY CO., LTD.

UP300 Series

Product Introduction



1. Product Overview

1.1 Product Positioning and Selling Points

- **Product Positioning:** The UP300 serves as a complementary product to the UP210, targeting new markets and new customers, with a focus on addressing issues that the UP210 cannot resolve.
- **Product Selling Points:**
 - (1) With new coating technology that increases machining hardness, extending the range of machinable material hardness up to 52 HRC.
 - (2) Introduces high-precision and long-neck models to meet the demands of high-speed, high-precision machining in mold applications.
 - (3) Enables efficient machining, accommodating high-efficiency machining methods such as ramp milling and keyway milling.

No	Tool Type	Name	Applicable Industries	Application Conditions									Key Issues Addressed:
				Face Milling	Side Milling	Slot Milling	Profile Milling	Contour Milling	Trochoidal Milling	Helical Interpolation Milling	Ramp Milling	Plunge Milling	
1	Standard	4-flute, Square	General Machinery, Automotive, Mold Making, etc.	√	√	√		√	√	√	√	√	1. Slot milling cutting depth increased to 0.7D. 2. Added machining conditions such as trochoidal, helical interpolation, ramp, and plunge milling. 3. Ramp milling entry angle increased from 2° to 15°
2		4-flute, Radius	General Machinery, Automotive, Mold Making, etc.	√	√	√	√	√					
3		2-flute, Ball nose	General Machinery, Automotive, Mold Making (50%), etc.	√			√						
4	High-Precision	4-flute, Radius	Mold Making	√	√		√	√					For face, side, and contour milling, the round corner head's tip and peripheral edges demonstrate superior chipping resistance.
5		2-flute, Ball nose	Mold Making	√			√						For profile milling, the ball head exhibits enhanced wear resistance and chipping resistance, yielding improved surface finish quality.
6		4-flute, Radius, long-neck	Mold Making	√	√		√	√					For contour, face, and side milling, the round corner head's tip and peripheral edges demonstrate superior chipping resistance.
7		2-flute, Ball nose, long-neck	Mold Making	√			√						For profile milling, the ball head exhibits enhanced wear resistance and chipping resistance, yielding improved surface finish quality.
8	specialized-Keyway	4-flute, Square	Automotive, General Machinery		√	√						√	1. Keyway machining slot milling depth ranges from 0.7D to 0.8D. 2. Suitable for slot, plunge (straight plunging in closed slots), and side milling.

2024 Product Package:

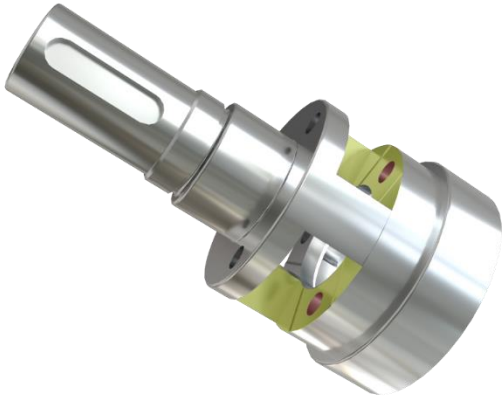
The UP300 series includes three types: Standard, High-Precision, and Dedicated, with eight models such as 4-flute square , 4-flute radius, and 2-flute ballnose, totaling 140 specifications.

1. Product Overview

1.2 Application Scope

● Application Scope:

- Suitable for machining materials such as General Steel, Cast Iron, Stainless Steel, and Pre-Hardened Steel ($\leq 52\text{HRC}$).
- Primarily used in **General Machinery**, **Automotive**, and **Mold Industries**, as well as in aerospace, 3C, heavy industry, and medical industry.



General Machinery Industry
Output shafts



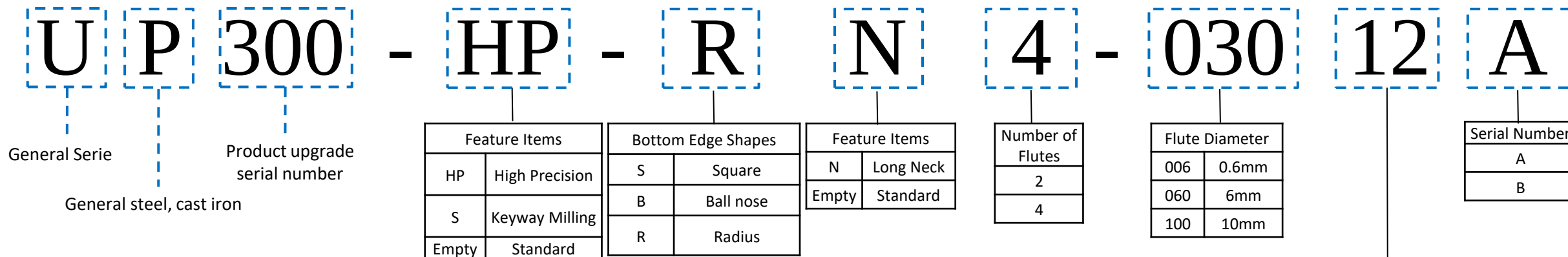
Mold Industry
Automotive bumper



Automotive Industry
Motor shafts

1. Product Overview

1.3 Naming Convention



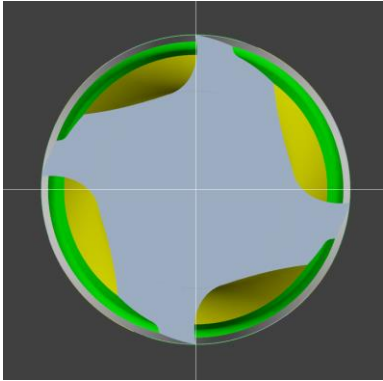
No	Tool Type	Name	version	range	Examples
1	Standard	4-flute, Square	UP300-S4	D1 ~ D20	UP300-S4-06016
2		4-flute, Radius	UP300-R4	D1 ~ D20	UP300-R4-06005
3		2-flute, Ball nose	UP300-B2	D1 ~ D20	UP300-B2-06012A
4	High-Precision	4-flute, Radius	UP300-HP-R4	D4-D12	UP300-HP-R4-06005A
5		2-flute, Ball nose	UP300-HP-B2	D1-D12	UP300-HP-B2-06006A
6		4-flute, Radius, long-neck	UP300-HP-RN4	D1-D4	UP300-HP-RN4-03012A
7		2-flute, Ball nose, long-neck	UP300-HP-BN2	D0.5-D4	UP300-HP-BN2-64020
8	specialized-Keyway	4-flute, Square	UP300-S-S4	D2.8-D7.8	UP300-S-S4-04808A

Feature Code			
1	Flat Head / Ball Head a. Neck Length b. Flute Length 06-6mm 10-10mm	2	Round Corner Head 02-R0.2mm 10-R1mm
		3	Corner Chamfer 03-C0.03 13-C0.13

Example : As shown above

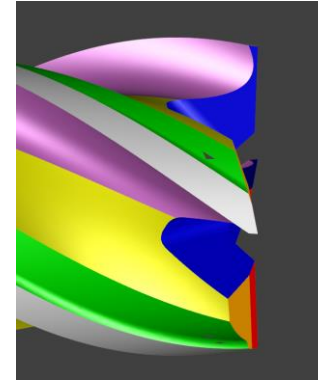
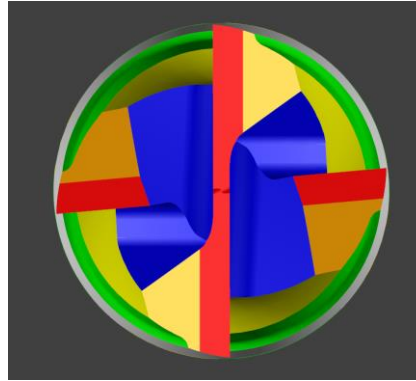
2. Product Features and Applications

2.1 Standard Models-S4/R4



Product Advantages 1:

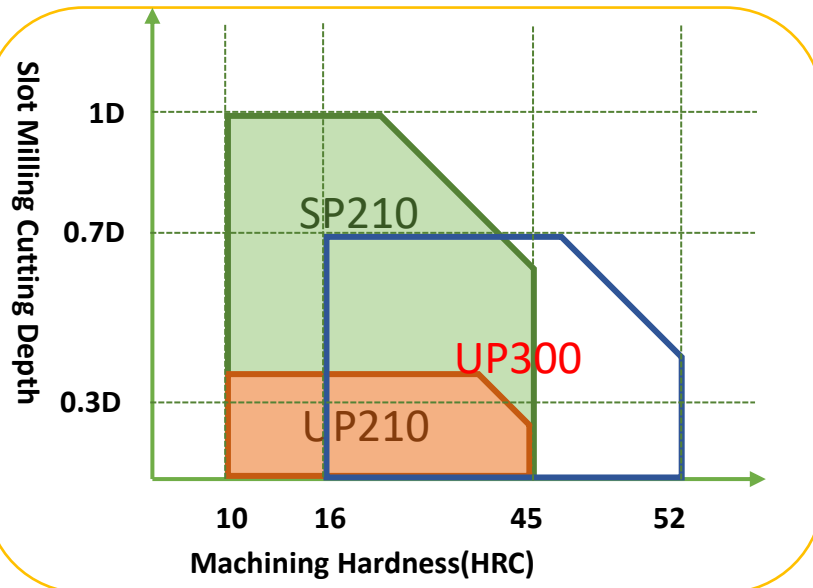
The implementation of unequal pitch angles combined with dedicated grinding wheels increases chip pocket space, significantly enhancing slot milling performance.



Product Advantages 2:

The specialized geometric design further expands chip pocket space, enabling an increase in ramp milling entry angles from 2° to 15°.

UP300-S4/R4 Comparative Analysis of Application Conditions



Application note:

1. The advanced coating technology elevates the machining hardness of cutting materials up to 52 HRC.
2. The combination of unequal pitch angles and specialized flute geometry increases slot milling depth to 0.7D.
3. The unique bottom cutting edge design allows ramp milling entry angles to be increased from 2° to 15°.
4. Model S4: Optimized for cavity and face milling and also strengthen the edge chipping resistance on peripheral cutting edges. It is ideal for applications such as trochoidal , helical interpolation , ramp , and plunge milling.
5. Model R4: Designed for slot , side , face , and contour milling, also enhanced chipping resistance on both corner radii and peripheral cutting edges.



2. Product Features and Applications

2.1 Standard Models-S4/R4

External Testing: In the face milling and side milling of stainless steel, the UP300 demonstrates a service life that surpasses that of competing products by 30%, effectively meeting the usage requirements of our clients.

Standard Model-S4

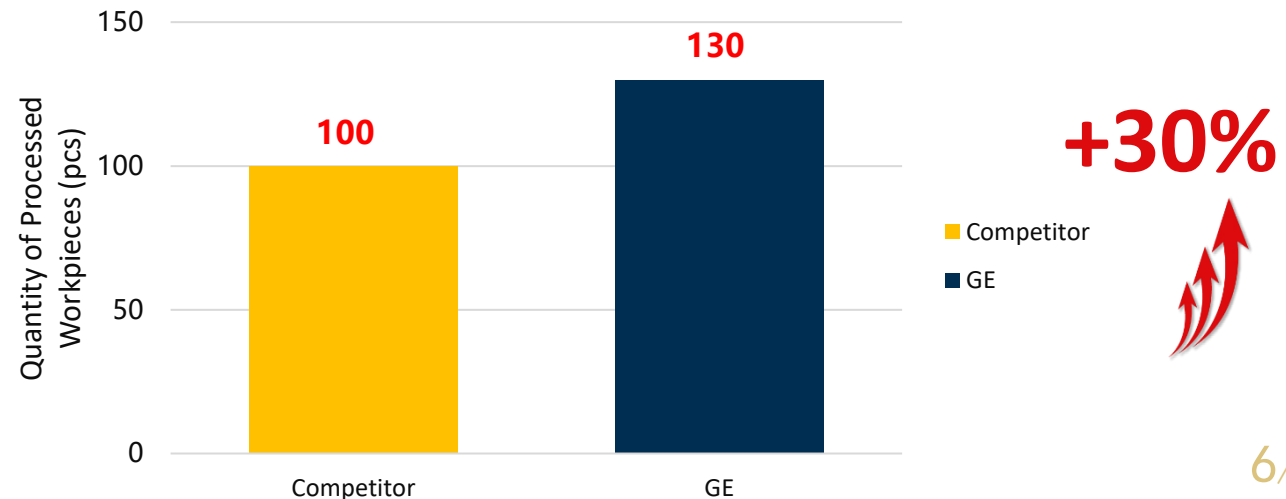
Customer	LM Precision Machinery
Current/Comparison	Competitor Z
Test Plan	GM0065QD
Tool Specifications	D10*25*75*d10
Workpiece	Slider
Workpiece Material	Stainless Steel 420F (HRC20)
Machining Type	Rough Machining
Cutting Method	Face Milling, Side Milling
Rotational Speed/Cutting Speed	3500RPM(110m/min)
Feed Rate	1500mm/min(0.1mm/z)
Cutting Volume	Face Milling: AP:0.6 AE:8 Side Milling: AP:15 AE:0.8
Cooling Method	Water-based Emulsion
Test Conclusion	Test Successful



Figure 1: Workpiece **Before** Machining

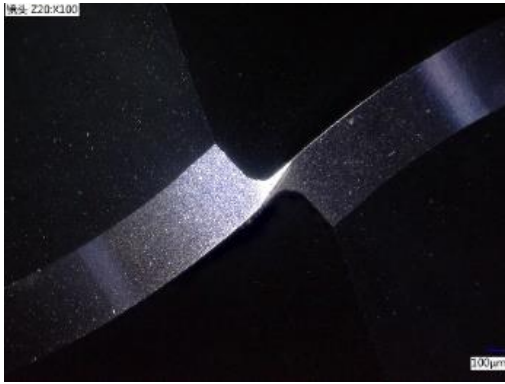


Figure 2: Workpiece **After** Machining



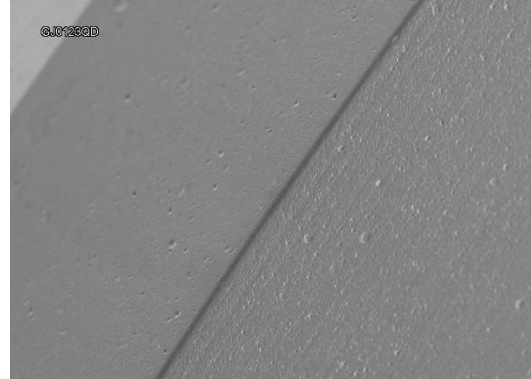
2. Product Features and Applications

2.2 General Models - B2



Product Advantages1 :

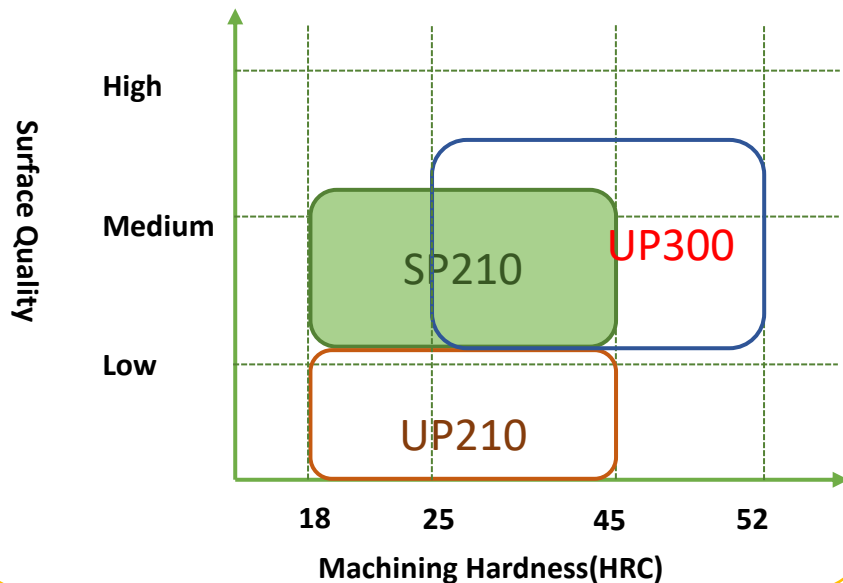
The cutting edge features a unique geometric design, improving machined surface quality.



Product Advantages2 :

Specialized edge treatment enhances cutting stability.

UP300-B2 Comparative Analysis of Application Conditions



Application note:

1. A novel coating enables machining of materials up to 52 HRC.
2. The combination of a unique geometric design and specialized edge treatment significantly improves wear resistance, chipping resistance, and surface finish in profile milling.

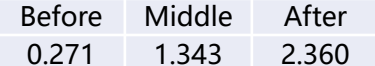
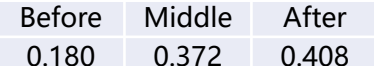


2. Product Features and Applications

2.2 General Models - B2

Internal Testing: When machining P20 and 45# steel, over the same cutting distance, the UP300 exhibits significantly reduced wear and superior surface quality compared to competing products.

➤ General Models - B2

Current/Comparison	UP300/Competing Products A						
Tool Specifications	R3*12*50*d6						
Machined Product	Flat Surface						
Workpiece Material	P20 (HRC30)						
Machining Type	Finish Machining	Competitor A: Cutting Time 400min Wear 0.150 mm			UP300: Cutting Time 400min Wear 0.021 mm		
Cutting Method	Contour Milling (Climb/Conventional Milling)						
Rotational Speed/Cutting Speed	10000RPM (188.4m/min)						
Feed Rate	2500mm/min (0.125mm/z)						
Cutting Volume	Ap=0.04mm Ae=0.06mm						
Cooling Method	Emulsion	Workpiece Surface Roughness Ra Value (μm)			Workpiece Surface Roughness Ra Value (μm)		
		Before	Middle	After	Before	Middle	After
		0.271	1.343	2.360	0.180	0.372	0.408

Current/Comparison	UP300/Competing Products A
Tool Specifications	R3*12*50*d6
Machined Product	85° Inclined Surface
Workpiece Material	45# (HRC30)
Machining Type	Finish Machining
Cutting Method	Contour Milling (Climb/Conventional Milling)
Rotational Speed/Cutting Speed	10000RPM (188.4m/min)
Feed Rate	2500mm/min (0.125mm/z)
Cutting Volume	Ap=0.04mm Ae=0.06mm
Cooling Method	Emulsion



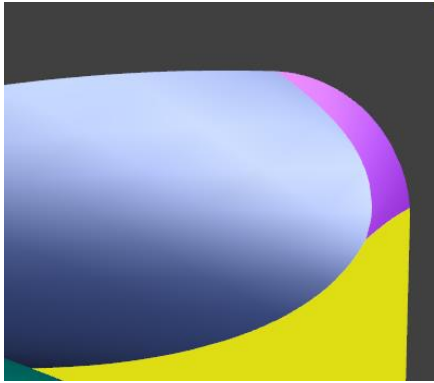
Competitor A: Cutting Time 360min
Wear 0.100mm



UP300: Cutting Time 360min
Wear 0.048mm

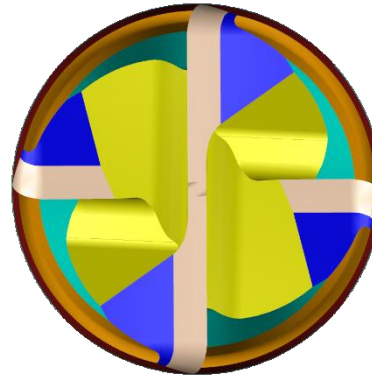
2. Product Features and Applications

2.3 High-Precision Model-R4/RN4



Product Advantage 1:

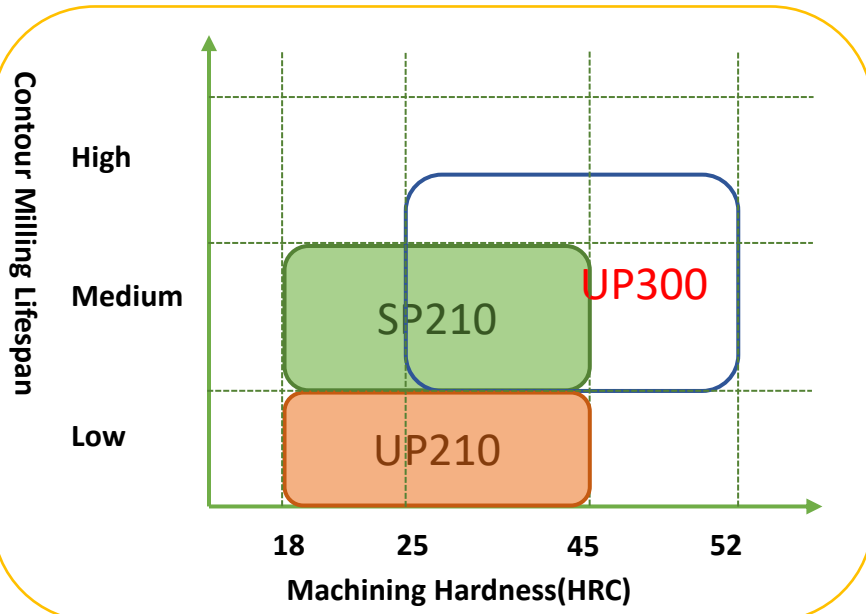
Enhanced R-corner strength significantly improves chipping resistance in the rounded corner areas.



Product Advantage 2:

The combination of dedicated grinding wheels and specialized geometric design increases chip pocket space, extending tool life in face milling and profile milling applications.

UP300-R4/RN4 Application Condition Comparison



Application note:

1. The innovative coating technology elevates the machining hardness of cutting materials up to 52 HRC.
2. The unique geometric configuration and precision edge treatment applied to the rounded corners enhance wear resistance and chipping resistance, effectively addressing edge chipping issues in contour milling.
3. The specialized geometric design of the bottom cutting edges further extends tool life in face and profile milling.
4. This product is specifically engineered for the mold industry, suitable for applications such as contour milling, cavity milling, face milling, and side milling.
5. High-precision R-corner tolerance: ± 0.005 mm



2. Product Features and Applications

2.3 High-Precision Model-R4/RN4

External Testing: Following 19 hours of continuous machining, the mold surface exhibits excellent finish integrity with minimal wear localized at the rounded corners. The side cutting edges demonstrate no evidence of chipping or fracture, maintaining full functional integrity. These results confirm compliance with the client's operational specifications..

»» High-Precision Model-R4

Customer	JL Mold
Current/Comparison	Competitor SG
Test Plan	GH0187QD
Tool Specifications	D8*R1*20*75*d8
Workpiece	Automotive Interior Component - Right Door Panel Plastic Mold
Workpiece Material	2434 (HRC46-48)
Machining Type	Semi-finish Machining
Cutting Method	Contour Milling (Climb Milling)
Rotational Speed/Cutting Speed	2400RPM(60m/min)
Feed Rate	3000mm/min(0.312mm/z)
Cutting Volume	Ap=0.15mm, Ae=0.15mm
Cooling Method	Water-based Emulsion
Test Conclusion	Test Successful



Figure 1: Overall View of the Mold



Figure 2: Surface Quality of the Machined Cavity Sidewall



Figure 3: Surface Quality of the Machined Product's Face and Sidewall

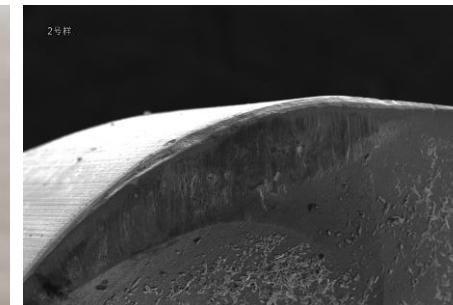
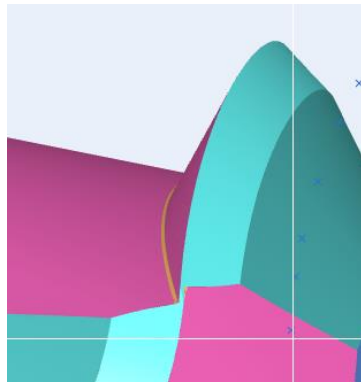
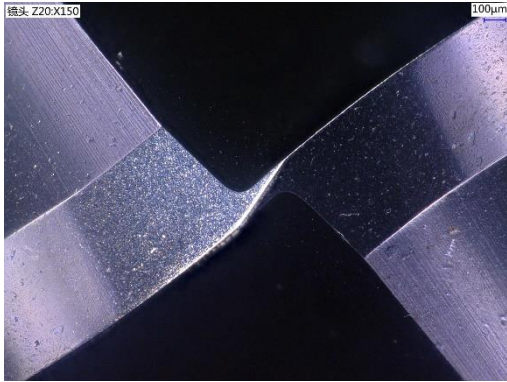


Figure 4: Tool Corner Slight Wear After 19 Hours of Machining

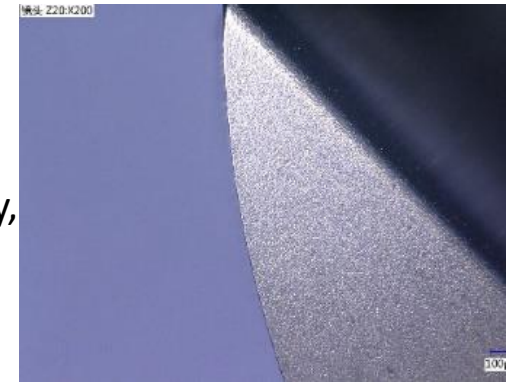
2. Product Features and Applications

2.4 High-Precision Model-B2/BN2



Product Advantage 1:

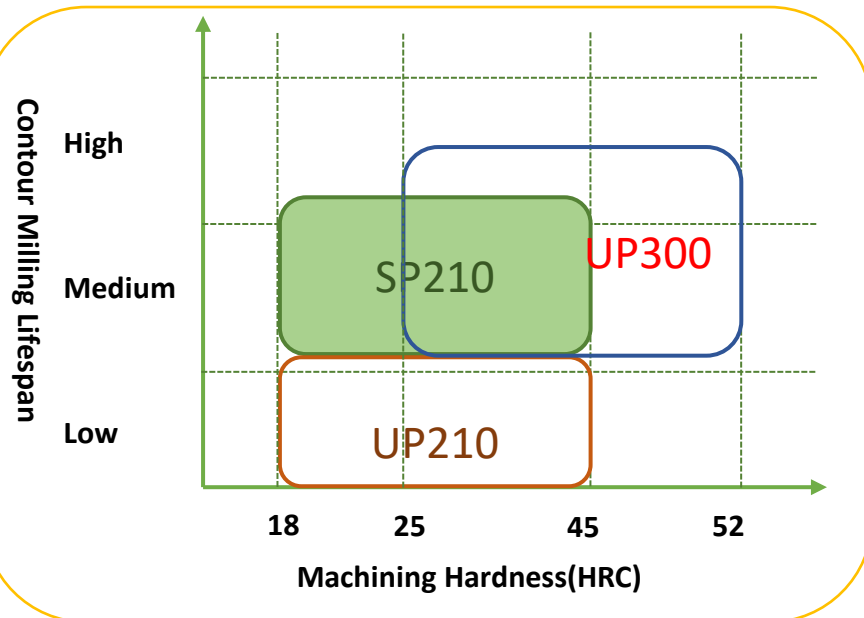
The unique geometric configuration enhances machined surface quality, ensuring superior finish integrity.



Product Advantage 2:

A specialized grinding process combined with advanced edge treatment technology significantly improves cutting stability and tool life.

UP300-B2/BN2 Application Condition Comparison



Application note:

1. The innovative coating formulation enables the machining of materials with hardness values up to 52 HRC.
2. The combination of geometric design and precision edge treatment delivers exceptional wear resistance, chipping resistance, and surface finish quality in profile milling applications.
3. This product is specifically engineered for the mold industry, excelling in operations at contour, face, and profile milling.
4. High-precision corner radius: For cutting edge diameters ≤ 6 mm: ± 0.005 mm; For cutting edge diameters > 6 mm: ± 0.007 mm



2. Product Features and Applications

2.4 High-Precision Model-B2/BN2

External Testing : After 12 hours of finish machining, no chipping was observed on the product surface. The machined surface exhibited a glossy finish, meeting the client's specifications.

» 高精度型号-B2

Customer	JL Mold
Current/Comparison	China-made Cutting Tools R4*8*75*d8
Test Plan	GL0170QD-30754
Tool Specifications	R4*8*75*d8
Workpiece	Automotive Plastic Molds
Workpiece Material	P20 (HRC35-38)
Machining Type	Finish Machining
Cutting Method	Profile Milling (Climb/Conventional Milling)
Rotational Speed/Cutting Speed	8000RPM(200.9m/min)
Feed Rate	3000mm/min(0.187mm/z)
Cutting Volume	Ap=0.2mm, Ae=0.2mm
Cooling Method	Air Cooling
Test Conclusion	Test Successful



Figure 1: Automotive Plastic Mold

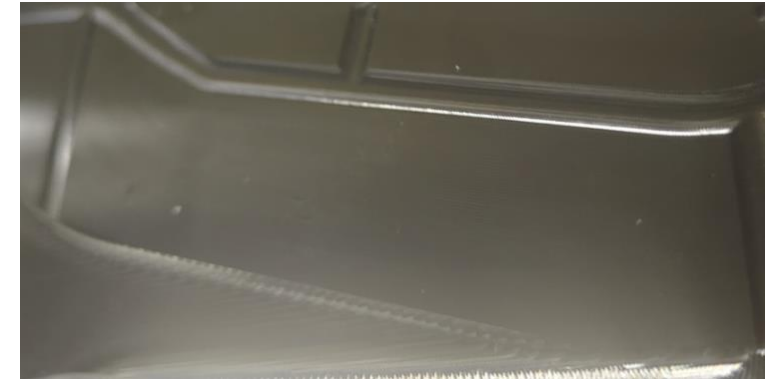


Figure 2: Workpiece Surface Effect After 12 Hours of Machining



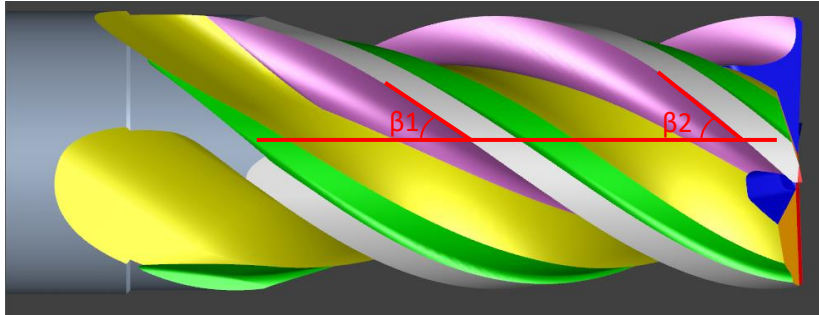
Figure 3: Image of the New Tool



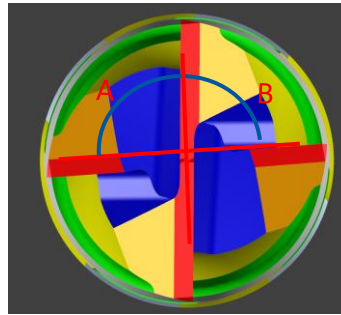
Figure 4: Image of the Tool After 12 Hours of Machining

2. Product Features and Applications

2.5 Dedicated Model-Keyway Machining-S4



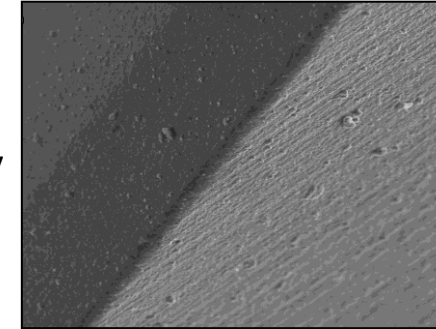
$\beta_1 \neq \beta_2$ Variable Helix Angles



$A \neq B$ Variable Pitch

Product Advantage 1:

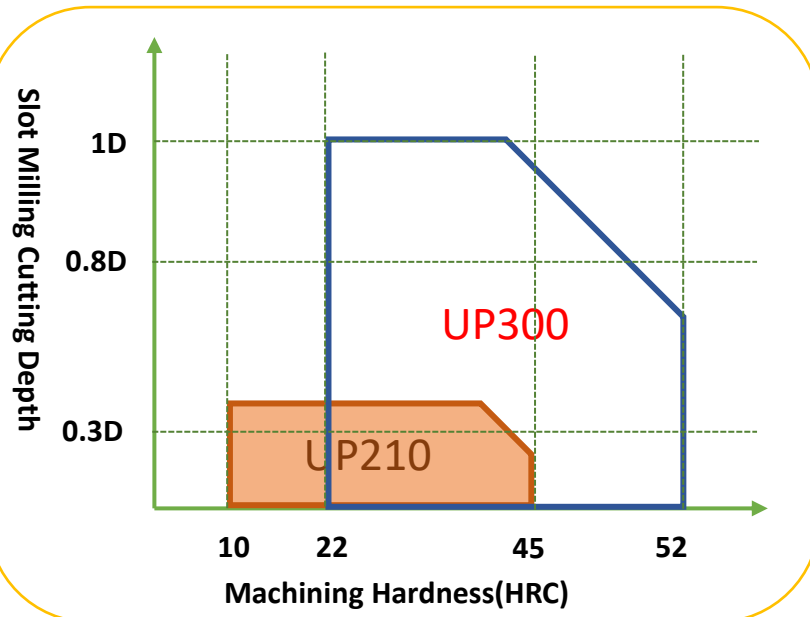
The combination of variable helix angles and specialized flute geometry delivers exceptional vibration damping performance during slot milling operations.



Product Advantage 2:

The specialized cutting-edge treatment improves tool wear and chipping resistance.

UP300-S-S4 Application Condition Comparison



Application note:

1. The new coating technology enables machining of materials with hardness up to 52 HRC.
2. The combination of variable helix angles and specialized geometry improves tool stability and extends tool life during slot milling operations.
3. It is primarily used for keyway machining in the automotive and general machinery industries, suitable for slot, plunge (straight plunging in closed slots), and side milling applications.



2. Product Features and Applications

2.5 Dedicated Model-Keyway Machining-S4

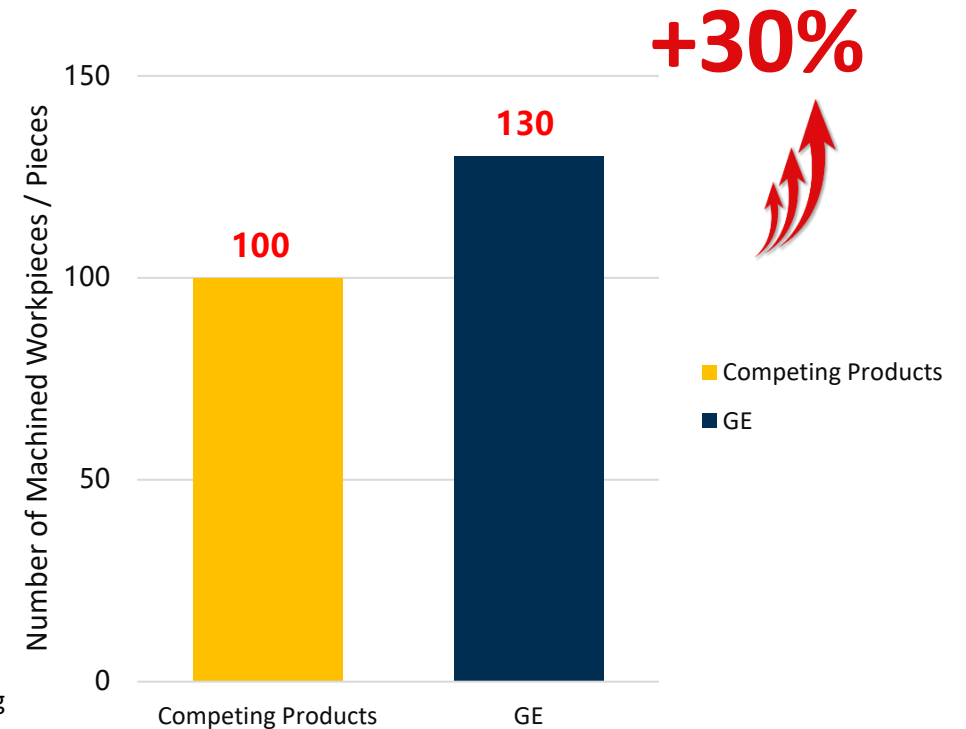
External Testing: During slot milling of 20CrMnTi, the UP300 demonstrates a service life that surpasses that of competing products by 30%, effectively meeting the client's usage requirements.

»» Dedicated Model - Keyway Machining-S4

Customer	WW Machinery
Current/Comparison	Competitor K
Test Plan	GG0056QD
Tool Specifications	D5.8*C0.1*15*50*d6
Workpiece	Motor Shaft
Workpiece Material	20CrMnTi (HRC28-30)
Machining Type	Rough Machining
Cutting Method	Slot Milling
Rotational Speed/Cutting Speed	4000RPM(73m/min)
Feed Rate	450mm/min(0.03mm/z)
Cutting Volume	AP:3-5, AE:5.8
Cooling Method	Water-based Emulsion
Test Conclusion	Test Successful



Figure 1: Schematic Diagram of the Workpiece After Machining



3. Inventory

2024 Product Package: The UP300 series includes three types: Standard, High-Precision, and Dedicated, with eight models such as 4-flute flat head, 4-flute round corner head, and 2-flute ball head, totaling 140 specifications.

Standard		Diameter Range	$1 \leq D \leq 20$		Diameter Range	$1 \leq D \leq 20$		Diameter Range	$1 \leq D \leq 20$	Specialized Keyway		Diameter Range	$2.8 \leq D \leq 7.8$
		Number of Specifications	22		Number of Specifications	31		Number of Specifications	17			Number of Specifications	9
		Inventory Specifications	21		Inventory Specifications	19		Inventory Specifications	12			Inventory Specifications	9
High-Precision		Diameter Range	$4 \leq D \leq 12$		Diameter Range	$1 \leq D \leq 12$		Diameter Range	$1 \leq D \leq 4$			Diameter Range	$0.5 \leq D \leq 4$
		Number of Specifications	10		Number of Specifications	14		Number of Specifications	14			Number of Specifications	23
		Inventory Specifications	8		Inventory Specifications	10		Inventory Specifications	5			Inventory Specifications	7



THANKS

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XIAMEN GOLDEN EGRET SPECIAL ALLOY CO.,LTD.

中国厦门湖里区兴隆路69号

No.69,Xinglong Road,Huli,Xiamen,China

Tel: 0592-5621830

Fax: 0592-2650639